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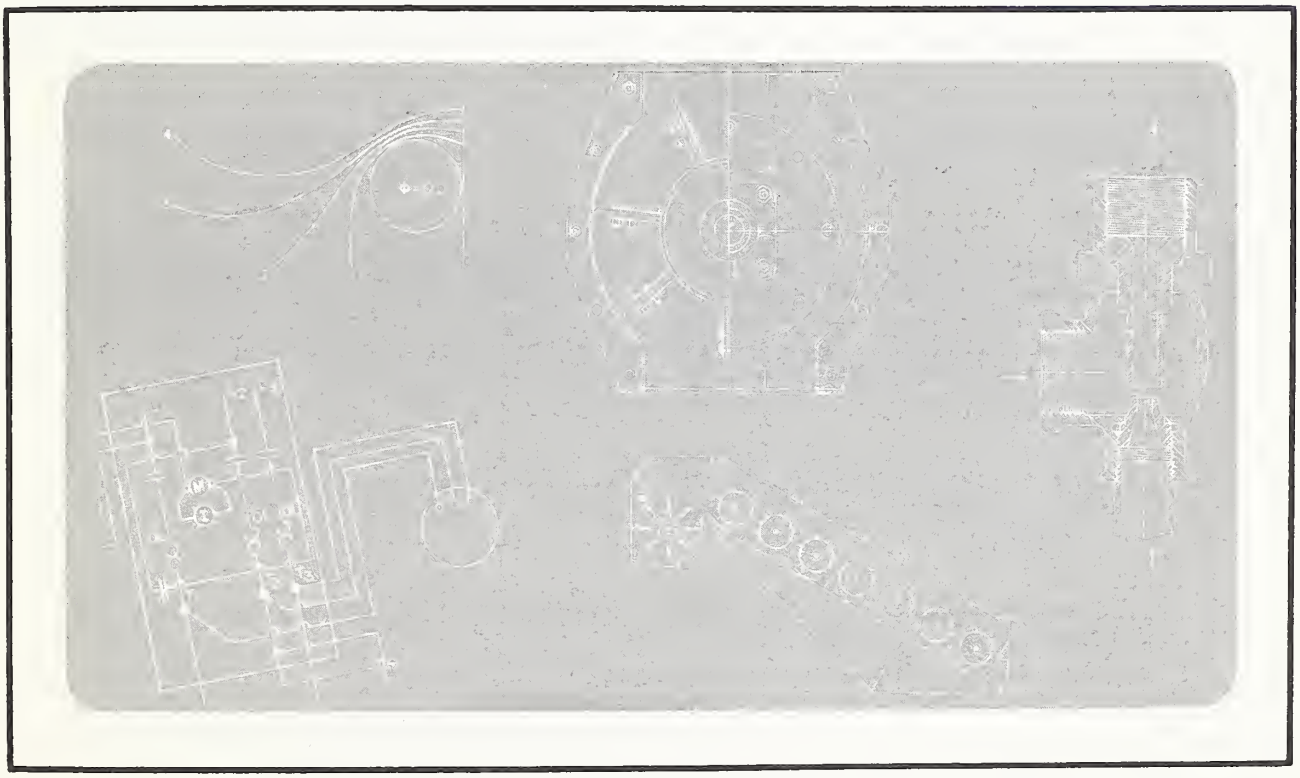

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ILLUSTRATIONS

The research reported in this publication was done in cooperation with the Mississippi Agricultural and Forestry Experiment Station. D. K. Harsh and W. C. Jordan, engineering technicians, Boll Weevil Research Laboratory, Science and Education Administration, assisted in the development of the equipment. O. L. Malone, research technician, Boll Weevil Research Laboratory, and Jon Roberson, entomologist, and Stanley Malone, research technician, Robert T. Gast Rearing Laboratory, Animal and Plant Health Inspection Service, assisted in testing the equipment.

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"Rackveyor" for Use in Mass Rearing of Boll Weevils

By J. G. Griffin[1]

ABSTRACT

The trays of larval diet and eggs in a boll weevil mass-rearing operation must be maintained in the proper environment while being conveyed from place to place. The equipment described provides a place to stack the trays, allows a satisfactory environment to surround the stacked trays (provided a proper environment is maintained in the holding rooms), and provides means for conveying the trays from one location to another. The unit saves time and labor and provides a more satisfactory microenvironment around the trays than previously used equipment. Index terms: *Anthonomus grandis* Boheman, insect-rearing equipment.

INTRODUCTION

Formed plastic trays are used to hold larval diet and eggs during the development and emergence of mass-reared boll weevils, *Anthonomus grandis* Boheman, at the Robert T. Gast Rearing Laboratory, Mississippi State, Miss. (Griffin 1978). After being covered and sealed, the trays were heretofore stacked on the shelves of carts, with a piece of screen wire serving as a spacer between each unit of eight cuts of trays (Griffin et al. 1979). The stacking method did not provide adequate air circulation around or gas movement in and out of the trays to provide for the necessary microenvironment to produce the maximum yield of weevils. The use of wire spacers was expensive: the spacers had to be sterilized and stored in a sterile condition until they were ready to be used; each spacer had to be handled during tray-stacking and tray-removal operations; and they had to be collected and stored after each use. A new "rackveyor" was developed to replace the cart system. It eliminates the use of wire spacers and thus increases efficiency and reduces the cost of weevil rearing. The rackveyor can be comfortably conveyed by one person.

EQUIPMENT

The rackveyor consists of a main frame made of stainless-steel angle, nine pairs of posts attached to the frame, angle brackets on which the trays are stacked, and a metal base with four swivel casters. The unit contains 8 cavities for stacking the trays, and each cavity has 56 sets of angle brackets, which hold 2 trays apiece, for a total capacity of 896 trays. Details and views of the unit are shown in figures 1 and 2.

The main frame of the rack is 64¼ inches long, 55½ inches high, and 22¼ inches wide, and is constructed of stainless-steel angle material, 1½ inches by 1½ inches by ⅛ inch, cut to length and welded together. The tray support brackets are made of 22-gage sheet metal cut into strips 1¼ inches wide and 22¼ inches long that are bent to form angles, ⅝ inch by ⅝ inch by 22¼ inches. These bracket angles are nailed at each end to the 2-by-4 support posts and are spaced $^{15}/_{16}$ inch, center to center, vertically along the posts. The posts are painted with an epoxy paint.

The support posts are placed vertically in the

[1] Agricultural engineer, Boll Weevil Research Laboratory, Science and Education Administration, U.S. Department of Agriculture, P.O. Box 5367, Mississippi State, Miss. 39762.

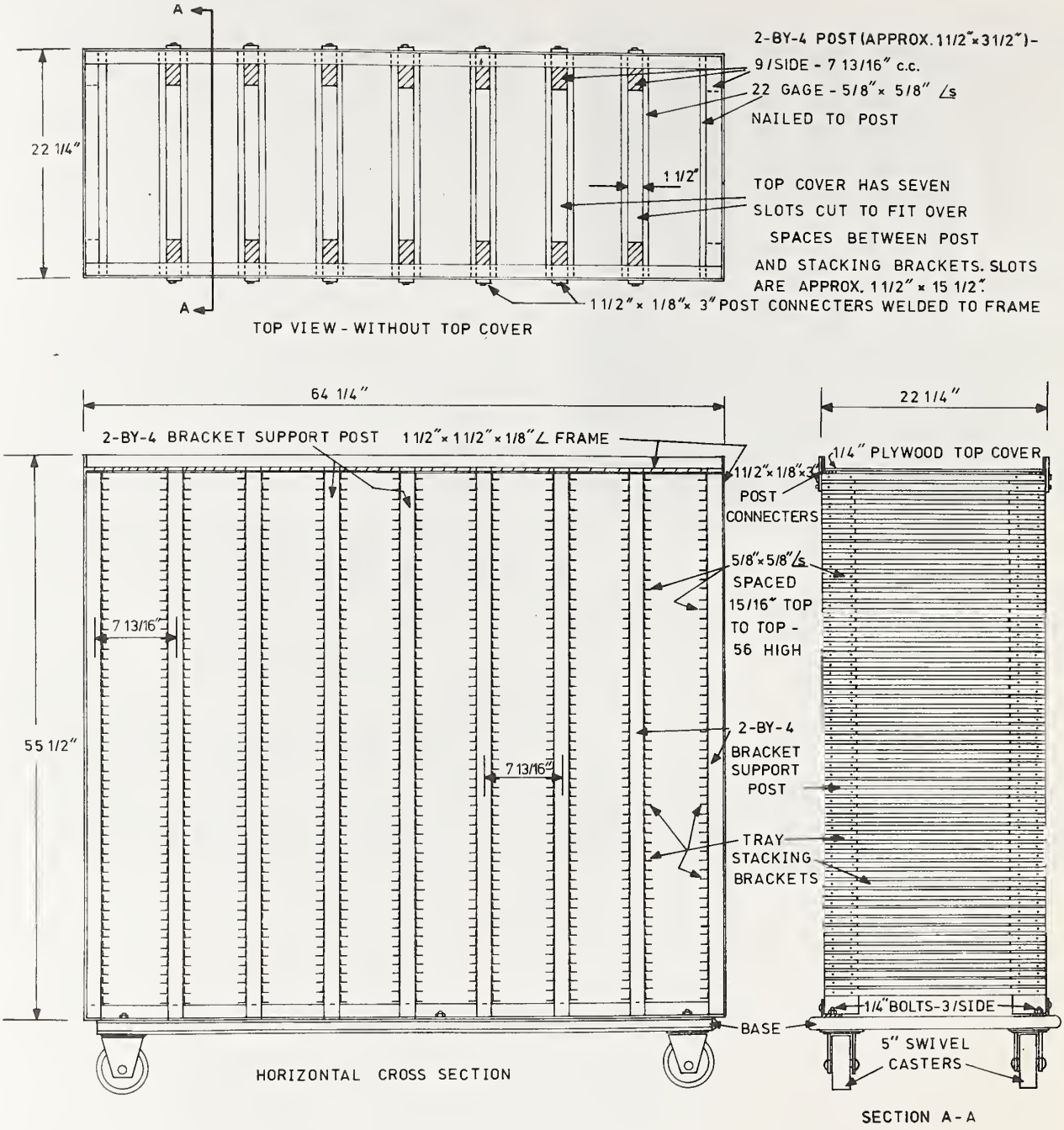

FIGURE 1.—Details of rackveyor.

main frame, with $6^{5}/_{16}$ inches between posts ($7^{13}/_{16}$ inches from center to center). The interior posts have bracket angles fastened to both sides, but the end posts have bracket angles fastened to only one, the interior side. The end posts are screwed to the end members of the main frame. The interior posts are screwed at the top to post connecters welded to the frame and at the bottom to the main frame angles. The main frame is attached to a William Hodges and Co. model F560 aluminum base with their model H5 5-inch all-swivel casters.

A ¼-inch plywood sheet painted with epoxy paint is used as a cover. There are seven slots, 1½ inches wide and 15½ inches long, cut in the cover sheet and positioned over the spaces between the

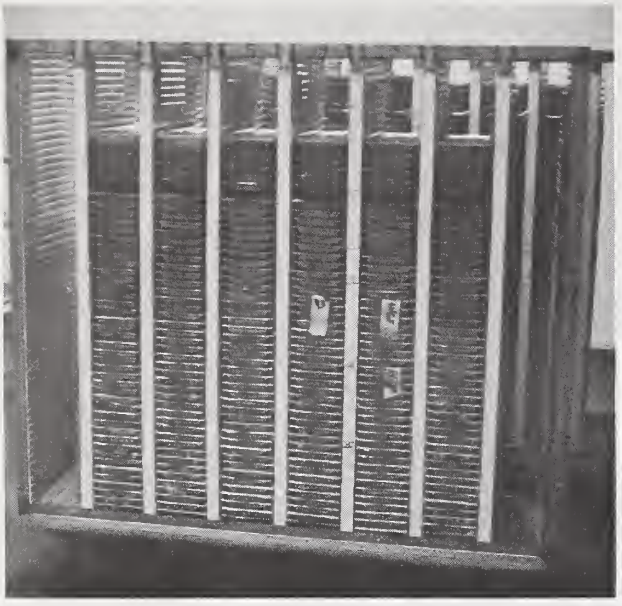

FIGURE 2.—View of rackveyor partially filled with trays.

interior posts. The slots provide air circulation around the trays when they are stacked on the brackets.

DISCUSSION

The vertical and horizontal spacings given for the rackveyor are suitable for the size of the trays tested and for the ambient environmental room conditions recommended for boll weevil development. Other tray sizes or environmental conditions might require a change in the horizontal and vertical spacings. The cut of trays used is 6 inches wide, 22¼ inches long, and ¾ inch high. (Each cut consists of two trays.) The $^{15}/_{16}$-inch vertical spacing between bracket angles allows a $^{3}/_{16}$-inch vertical space between stacked trays and a $^{5}/_{16}$-inch vertical clearance between any two adjoining ⅝-inch by ⅝-inch angle brackets. This space provides for air, water vapor, and other gas movement across the trays and brackets. Preliminary studies show that clearance at these points is critical. The $^{3}/_{16}$-inch and $^{5}/_{16}$-inch spaces give satisfactory production results. An approximate horizontal space of 1½ inches between trays is used because it is within the tested acceptable range, and the 2-by-4 support posts have this dimension without extra resizing. Wood posts are used because they are readily available and economical, but metal channel members can be substituted.

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